HUMAN RESOURCES FOR TREATING NEW CANCER CASES IN BRAZIL

Executive Summary

The purpose of this report is to describe the human resources needed in Brazil to treat new cancer patients.

The population of Brazil is approximately 191.97 million (94.576 million men and 97.395 million women) and the estimated number of new cancer cases in Brazil for the year 2008, based on Globocan data for Brazil as a whole (http://globocan.iarc.fr/) was 320955 (160584 in men and 160371 in women) (Table A). The five most common cancers in Brazil are (1) urological (bladder, kidney, prostate and testis), (2) breast (3) gynecological (cervix uteri, corpus uteri and ovary), (4) head and neck (lip and oral cavity, nasopharynx, other pharynx, larynx and thyroid) and (5) lung.

Table A: The ten most frequently occurring cancers in Brazil for men and women based on 2008 Globocan data (http://globocan.iarc.fr/).

Cancer	Both	Rank	Men	Rank	Women	Rank
All cancers excl. non-melanoma skin cancer	**320955**		**160584**		**160371**	
Urological	54408	1	51044	1	3364	11
Breast	42566	2			42566	1
Gynecological	34506	3			34506	2
Head and Neck	27056	4	17583	2	9473	4
Lung	24832	5	16377	3	8455	5
Colorectal	21768	6	10121	6	11647	3
Stomach	20466	7	13563	4	6903	7
Hematological Malignancies	19624	8	11281	5	8343	6
Esophagus	9354	9	6830	7	2524	12
Liver	9151	10	4991	8	4160	8
Brain, nervous system	8461	11	4609	9	3852	9
Pancreas	7168	12	3625	10	3543	10

Newly diagnosed cancer patients need pathology, surgery, chemotherapy and/or radiation therapy. The number of oncologists needed is based, therefore, on the number of patients requiring pathology, surgery, chemotherapy and radiation therapy (Table B). This number is estimated from the percentage of patients

requiring surgery, chemotherapy and/or radiation therapy for the top ten cancers in both men and women. For developing countries the International Atomic Energy Agency (IAEA) recommends training Radiation/Clinical Oncologists who can prescribe both radiation and chemotherapy for the common solid cancers, instead of separate medical and radiation oncologists. Hematological malignancies are treated primarily by hematologist-oncologists. The number of specialists needed is based upon the number of cancer patients but each city, in order to ensure coverage if one person leaves or goes on vacation, must have at least 2 surgical oncologists, 2 radiation/clinical oncologists, 2 hematologist oncologists, etc.

Table B: Number of Oncologists needed for Brazil's two most populous cities based on 2010 population estimates (http://citypopulation.de/) and 2008 Globocan data for new cancer cases (http://globocan.iarc.fr/).

	New Cancer Cases	Hematologist Oncologists	Surgical Oncologists	Radiation / Clinical Oncologists	Urologic Oncologists	Gynecologic Oncologists	Pathologists
São Paulo	**18601**	3	17	94	7	5	38
Rio de Janeiro	**10572**	2	10	53	4	3	22

In addition to oncologists, support staff such as onco-pharmacists, pharmacy technicians, oncology nurses and palliative care specialists is also needed. Many cancer patients require hospitalization for diagnosis, treatment and/or complications, therefore an adequate number of oncology beds will be needed. The number of oncology nurses, onco-pharmacists and pharmacy technicians needed is based upon the number of beds occupied daily by cancer patients while the number of palliative care specialists is based on the number of new cancer cases per year (Table C). The oncology nursing staff for each 24-bed oncology unit (operating 24 hours a day, 7 days a week) comprises of one head nurse and a nurse specialist as well as 13 nurses working 8 hour shifts, 5 days per week.

Table C: Number of Oncology Units, Nursing and Pharmacy Staff needed for Brazil's two most populous cities based on 2010 population estimates (http://citypopulation.de/) and 2008 Globocan data for new cancer cases (http://globocan.iarc.fr/).

	New Cancer Cases	Oncology Beds/Day	24 bed Oncology Wards	Onco-Pharmacists	Pharmacy Technicians	Palliative Care Specialists	Oncology Ward Nurses
São Paulo	**18601**	311	13	52	78	38	195
Rio de Janeiro	**10572**	177	8	32	48	22	120

Since many cancer patients require radiotherapy, appropriately equipped facilities will be needed along with radiation oncology staff (Tables D and E). Radiation oncology staff includes radiation therapy technicians, medical physicists, Linac engineers and radiation oncology nurses in addition to radiation/clinical oncologists. The minimum radiation therapy equipment requirements are at least one of each: Linac, brachytherapy unit, CT simulator, treatment planning computer and dosimetry/quality assurance package.

Table D: Radiation Therapy Staff needed for Brazil's two most populous cities based on 2010 population estimates (http://citypopulation.de/) and 2008 Globocan data for new cancer cases (http://globocan.iarc.fr/).

	New Cancer Cases	Radiation / Clinical Oncologists	Radiation Therapy Technicians	Medical Physicists	Linac Engineers	Radiation Oncology Nurses
São Paulo	**18601**	94	125	42	11	42
Rio de Janeiro	**10572**	53	72	24	6	24

Table E: Radiation Therapy Equipment needed for Brazil's two most populous cities based on 2010 population estimates (http://citypopulation.de/) and 2008 Globocan data for new cancer cases (http://globocan.iarc.fr/).

	New Cancer Cases	Linac / Co 60 Megavolt Unit	Brachytherapy Units	CT Simulators	Treatment Planning Computers	Dosimetry /QA Packages
São Paulo	**18601**	21	11	11	11	11
Rio de Janeiro	**10572**	12	6	6	6	6

NOTE: Guidelines from the IAEA of the United Nations were used to calculate the radiation therapy equipment and staff needed in the setting of a developing country. Guidelines from the Oncology Nursing Society were used to calculate the number of nurses needed. Several other specialty societies were also requested to provide guidelines but in most cases there were none, therefore colleagues active in those fields were consulted for estimating the number of staff needed.